Foresight Flood and Coastal Defence Project

Sustainability

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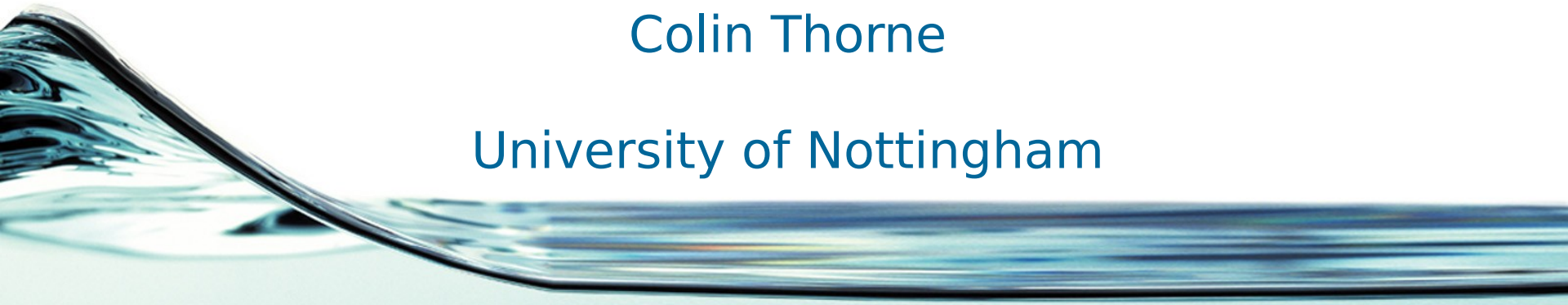


We know the Responses – but are they sustainable?

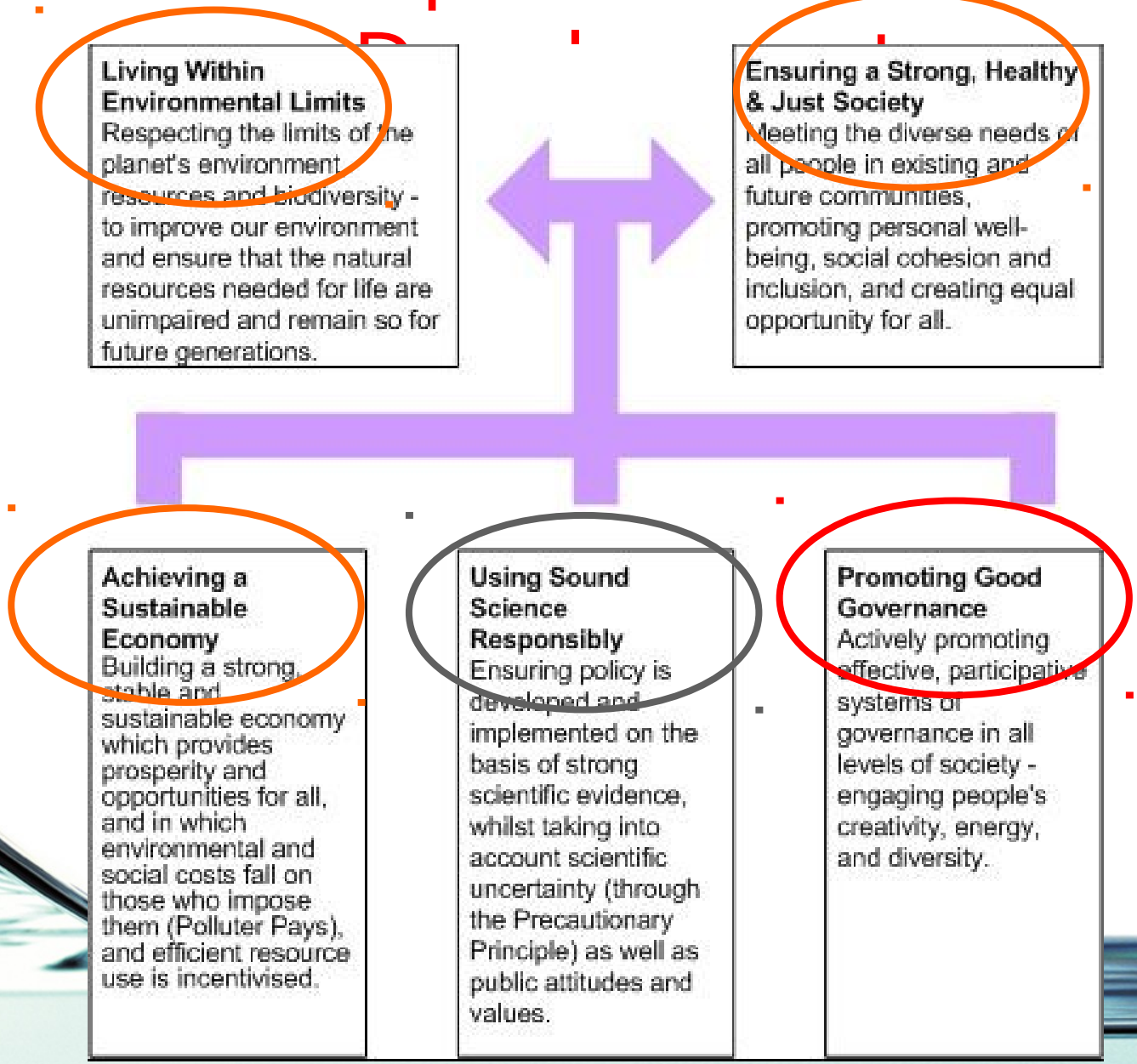
80 individual responses

Organised into **26** response groups

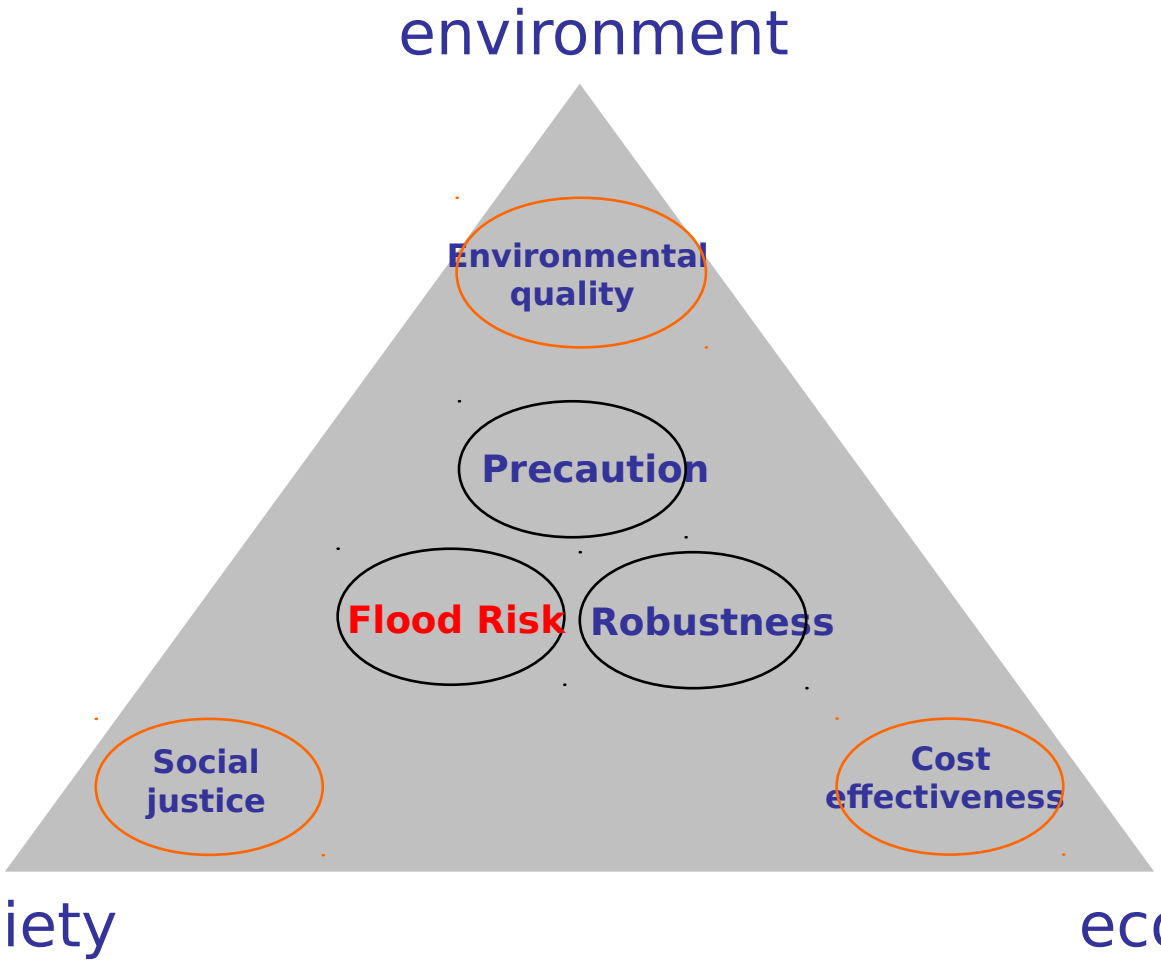
And **5** response themes

- Reducing urban runoff
- Managing flood events
- Reducing flood losses
- Engineering and large scale re-alignment or abandonment
- Reducing rural runoff

UK Principles of Sustainable


Living Within Environmental Limits
Respecting the limits of the planet's environment, resources and biodiversity - to improve our environment and ensure that the natural resources needed for life are unimpaired and remain so for future generations.
Ensuring a Strong, Healthy & Just Society
Meeting the diverse needs of all people in existing and future communities, promoting personal well-being, social cohesion and inclusion, and creating equal opportunity for all.
Achieving a Sustainable Economy
Building a strong, stable and sustainable economy which provides prosperity and opportunities for all, and in which environmental and social costs fall on those who impose them (Polluter Pays), and efficient resource use is incentivised.
Using Sound Science Responsibly
Ensuring policy is developed and implemented on the basis of strong scientific evidence, whilst taking into account scientific uncertainty (through the Precautionary Principle) as well as public attitudes and values.
Promoting Good Governance
Actively promoting effective, participative systems of governance in all levels of society - engaging people's creativity, energy, and diversity.

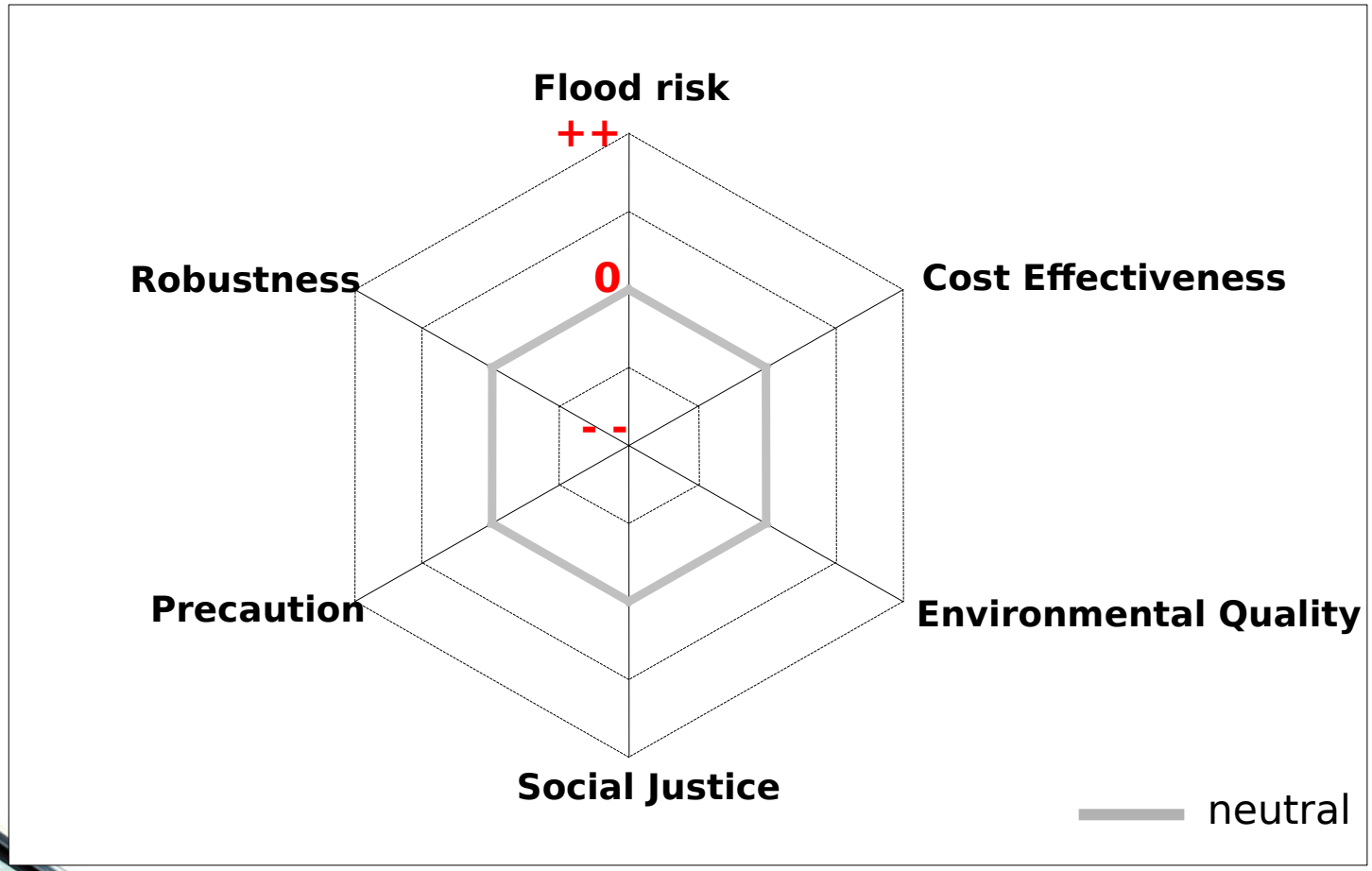
Sustainability analysis



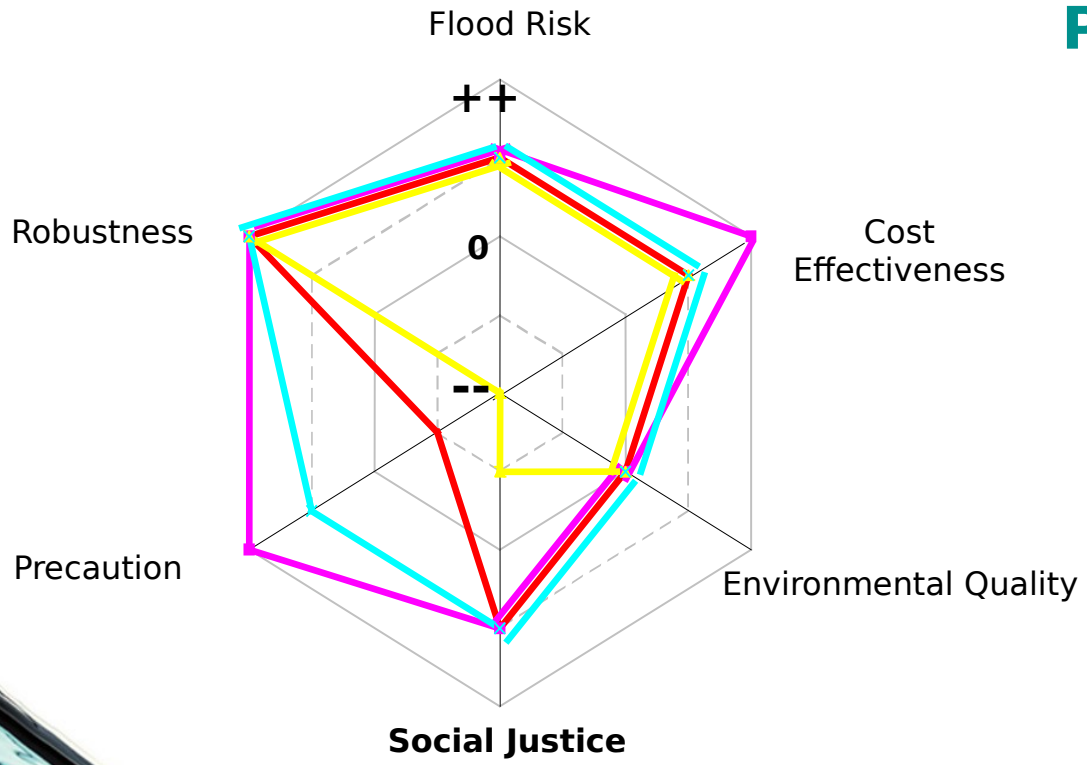
Defining the metrics

- **Cost effectiveness**
  - The cost effectiveness of implementing the response option
- **Social justice**
  - The impact of action on different types of household
- **Environmental quality**
  - The impact on biodiversity and the area and quality of habitats
- **Robustness**
  - The ability of the response actions to cope with uncertainty relating to socio-economic factors and climate change
- **Precaution**
  - This metric relates to the ability to cope with extreme events and operational uncertainty in implementing the responses

Sustainability analysis scoring



Sustainability analysis – a typical example



Pre-event Measures

- **Flood preparedness planning**
- **Communication and education**
- **Flood-risk mapping**
- **Flood plans**
- **Flood log books**

Sustainability Analysis – how the responses fared

	World Markets		National Enterprise		Local Stewardship		Global Sustainability
	River defences		River defences		Land use management		Catchment wide storage
	Coastal defences		Coastal defences		Flood proofing		Land use management
	Reduce coastal energy		Reduce coastal energy		Individual damage avoidance		River defences
	Morphological coastal protection		Realign coastal defences		River defences		Coastal defences
	Realign coastal defences		Morphological coastal protection		Catchment wide storage		Rural conveyance
	Forecasting and warning		Coastal defence abandonment		Pre-event measures		Realign coastal defences
	Flood fighting		River conveyance		Forecasting and warning		Reduce coastal energy
	River conveyance		Catchment wide storage		Flood fighting		Morphological coastal protection
	Building codes		Engineered flood storage		Engineered flood storage		Forecasting and warning
	Individual damage avoidance		Flood proofing		Rural conveyance		Engineered flood storage
	Pre-event measures		Flood fighting		Land use planning		Pre-event measures
	Flood proofing		Land use planning		Collective damage avoidance		Flood fighting

Major reduction in flood risk S<0.7

Marked reduction in flood risk 0.7<S<0.9

Sustainability Analysis – how the responses fared

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Coastal defences	Coastal defences	Flood proofing	Land use management
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Morphological coastal protection	Realign coastal defences	River defences	Coastal defences
Realign coastal defences	Morphological coastal protection	Catchment wide storage	Rural conveyance
Forecasting and warning	Coastal defence abandonment	Pre-event measures	Realign coastal defences
Flood fighting	River conveyance	Forecasting and warning	Reduce coastal energy
River conveyance	Catchment wide storage	Flood fighting	Morphological coastal protection
Building codes	Engineered flood storage	Engineered flood storage	Forecasting and warning
Individual damage avoidance	Flood proofing	Rural conveyance	Engineered flood storage
Pre-event measures	Flood fighting	Land use planning	Pre-event measures
Flood proofing	Land use planning	Collective damage avoidance	Flood fighting

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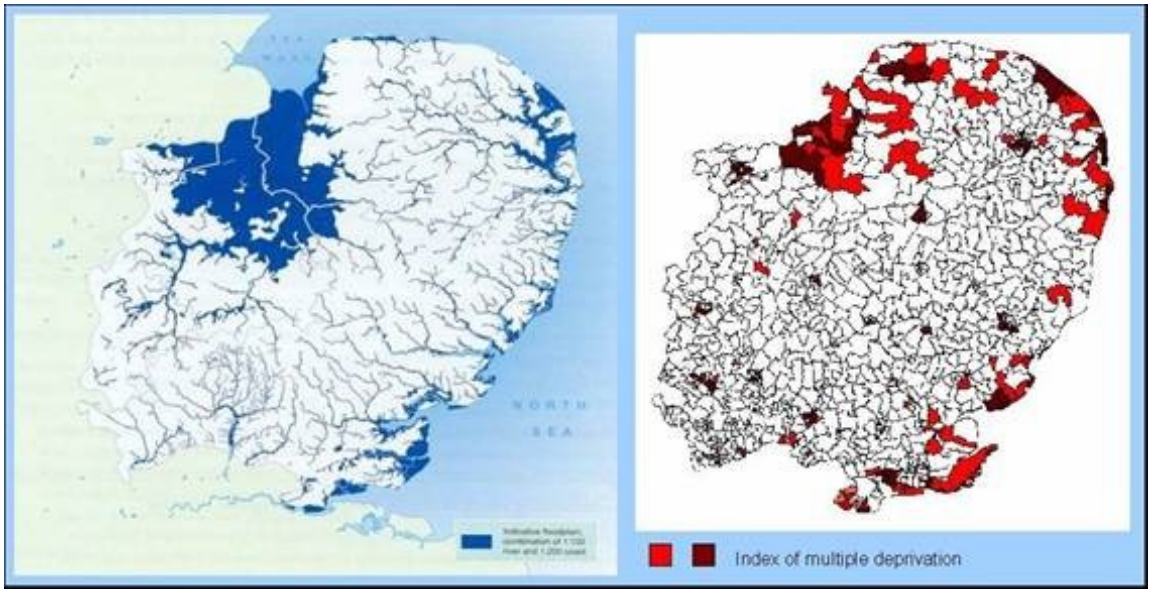
Sustainability Analysis – how the responses fared

	Number of infractions			
Sustainability metric	World Markets	National Enterprise	Local Stewardship	Global Sustainability
Cost effectiveness	3	2	1	1
Environmental quality	5	5	2	1
Social justice	12	14	2	0
Precaution	6	8	5	0
Robustness across scenarios	5	5	5	5



The issue of social justice

- There are 12 failures under World Markets and 13 under
  National Enterprise

- The responses themselves do not necessarily lead to social
  injustice, it is the way that they are potentially applied

- This raises questions in relation to how the responses are
  delivered together with compensation and relocation

The issues of environmental quality

- Individual responses impact environmental quality in different ways:

Coastal defences, **River defences**, **River conveyance** and **Engineered flood storage** can have the most negative impacts on the environment, habitat and listed species

Enhancing environmental quality

Catchment-wide storage, **Land use planning and management**, **Realigning coastal defences** and **Coastal morphological protection** offer the greatest potential for both reducing flood risk and increasing environmental quality

Closing messages on Sustainability

- No emerging responses score well across all scenarios in terms of flood risk reduction and sustainability
- A portfolio of measures is required to deliver effective flood risk management that is sustainable
- Most concerns relate to the way that flood responses are implemented rather than the r

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In developing policy and projects, we should not eliminate any responses *a priori* but produce balanced portfolios of structural and non-structural responses that deliver flood risk reduction and sustainability